

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 15

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte ROMANO G. PAPPALARDO and ROGER B. HUNT JR.

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Appeal No. 96-1451  
Application No. 07/937,936<sup>1</sup>

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ON BRIEF

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Before JERRY SMITH, BARRETT, and GROSS, Administrative Patent Judges.

GROSS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1 through 18, which are all of the claims pending in this application.

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<sup>1</sup> Application for patent filed August 28, 1992.

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The appellants' invention relates to a fluorescent lamp with a blend of four phosphors, a blue, a green, a rare-earth activated red, and a non-rare earth containing red. Claim 1 is illustrative of the claimed invention, and it reads as follows:

1. A fluorescent lamp comprising a glass envelope having electrodes at its ends, a mercury and inert gas filling within said envelope which produces ultraviolet radiation, a coating comprising at least one layer of a quad-phosphor blend for converting a substantial portion of said ultraviolet radiation to visible illumination, said blend comprising a first and second red-emitting phosphor components, each red-emitting phosphor component having different visible emission spectrum principally in the 590 to 630 nm wavelength range, a third blue-emitting phosphor component having an emission spectrum principally in the 430 to 490 nm wavelength range, and a fourth green-emitting phosphor component having an emission spectrum principally in the 500 to 570 nm wavelength range, said first red-emitting phosphor being a rare-earth activated phosphor and said second red-emitting component being a non-rare-earth containing phosphor wherein the relative proportions of the phosphor components are such that an enhanced color rendering index is produced as compared to tri-component blends formed from a three-phosphor blend consisting of the said first red-emitting component and said third and fourth components.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Schreurs	4,055,781	Oct. 25, 1977
Walter	4,296,353	Oct. 20, 1981
Hoffman et al. (Hoffman)	4,623,816	Nov. 18, 1986
Yamamoto	60-014743	Jan. 25, 1985

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(Japanese Kokai patent publication)

IES Lighting Handbook 2-9 (5th ed., Illuminating Engineering Society 1972) (IES)

Claims 1 through 18 stand rejected under 35 U.S.C. § 103 as being unpatentable over Yamamoto in view of IES, further in view of Walter (claims 16 and 17), Schreurs (claim 8), or Hoffman (claims 4 through 7, 9, and 18).

Reference is made to the Examiner's Answer (Paper No. 14, mailed November 1, 1995) for the examiner's complete reasoning in support of the rejections, and to the appellants' Brief (Paper No. 13, filed August 7, 1995) for the appellants' arguments thereagainst.

#### OPINION

As a preliminary matter, we note that appellants indicate on page 3 of the Brief that claims 1 through 18 are to stand or fall together. Accordingly, we will treat claims 2 through 18 as standing or falling with claim 1, and will consider only Yamamoto and IES, the references applied against claim 1.

We have carefully considered the claims, the applied prior art references, and the respective positions articulated by the appellants and the examiner. As a consequence of our

review, we will reverse the obviousness rejection of claims 1 through 18.

As admitted by appellants (Brief, page 3), Yamamoto discloses a fluorescent bulb with a four phosphor blend of green, blue, and two red phosphor components, the wavelength ranges for all four components overlapping appellants' claimed ranges. One of the red phosphors is disclosed as having a wavelength range of 600-620 nm with the examples using rare earth, europium-activated yttrium oxide. Yamamoto discloses that the other has a wavelength range of 620-660 nm and specifies several examples, all but one of which are rare earth containing phosphors. IES lists a number of fluorescent phosphors with their peak of fluorescent band, their color, and their use. One such phosphor is lead and manganese activated calcium silicate which has a peak wavelength of 610 nm (which is within the range of 600-620 nm), has a pink color, and is used for improved-color cool and warm white.

The examiner states (Answer, page 5) that "Yamamoto does not appear to be limited to the exemplary phosphor components as evidenced by the disclosure of wavelength ranges as opposed to a constant wavelength." The examiner, therefore, proposes

substituting the non-rare earth containing, lead and manganese activated calcium silicate of IES for Yamamoto's rare earth oxide phosphor (each of which has wavelengths in the 600-620 nm range). The examiner's motivation for the substitution is to reduce the cost, as non-rare earth phosphors are known to be more easily obtainable and less expensive than rare earth phosphors. Further, the examiner asserts (Answer, page 12) that "rare-earth and non-rare-earth phosphors are functional equivalents and selection of the non-rare-earth phosphor is an obvious design choice because the non-rare-earth phosphor would perform the equivalent function at a greatly reduced cost."

Appellants contend that Yamamoto cannot be modified by substituting another material for the rare-earth containing red phosphor because Yamamoto specifies that it must be trivalent europium activated rare earth oxide. Appellants (Brief, page 4) point to page 4, lines 12-21, the examples on pages 6-9, and that "on pages 9-10 Yamamoto lists several other phosphors as substitutes for the blue, green, and 620-660 nm red components of the blend but does not list a

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substitute for the 600-620 nm red-emitting phosphor." We agree.

Yamamoto is not limited to the trivalent europium activated rare earth yttrium oxide of the examples. "It is axiomatic that a reference must be considered in its entirety, and it is well established that the disclosure of a reference is not limited to specific working examples contained therein. E.G., *In re Lamberti*, 545 F.2d 747, 750, 192 USPQ 278, 280 (CCPA 1976)." See *In re Fracalossi*, 681 F.2d 792, 794 n.1, 215 USPQ 569, 571 n.1 (CCPA 1982). However, in describing the composition of the invention, Yamamoto specifies (page 4) that the red component is "a rare earth oxide fluor activated by trivalent europium having its maximum wavelength radiation range 600-620 nm." The yttrium oxide of the examples then reinforces that the red component must be a rare earth oxide activated by trivalent europium. Thus, Yamamoto's disclosure for the red component is not as broad as merely specifying the wavelength range, as the examiner asserts. Yamamoto clearly indicates that the red component must be a rare earth oxide which is activated by trivalent europium. Since the

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substitution made by the examiner "is counter to the teachings of Yamamoto" (Brief, page 4), we cannot sustain the rejection.

It is worth noting that since Yamamoto specifies both rare earth and non-rare earth phosphors for the additional red component, a substitution of a non-rare earth material for the rare-earth materials listed, at first glance, might appear obvious to the skilled artisan. However, the lead and manganese activated calcium silicate that the examiner proposed as a substitute has a wavelength of 610 nm, which is outside Yamamoto's range of 620-660 nm for the additional red element. Therefore, it would not have been obvious to substitute calcium silicate for either of Yamamoto's red components.

#### CONCLUSION

The decision of the examiner rejecting claims 1 through 18 under 35 U.S.C. § 103 is reversed.

#### REVERSED

JERRY SMITH )  
Administrative Patent Judge )  
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	)	BOARD OF PATENT
LEE E. BARRETT	)	APPEALS
Administrative Patent Judge	)	AND
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ANITA PELLMAN GROSS	)	
Administrative Patent Judge	)	

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